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| 19. ABSTRACT (Continue on reverse if necessary and identify by block number) A Conference on the Neurophysiological Foundations of Visual Perception was held in Badenweiler, West Germany from 29 June to 3 July, 1987. In attendance were 75 scientists from all areas of vision research including the fields of anatomy, computer science, optometry, ophthalmology, physiology, and psychology. The participants were divided into individual working groups, each of which concentrated on a particular area of vision research. Each group presented a summary of the current state of the field for all conference participants. In this summary the participants emphasized the correlations between neuroanatomy, neurophysiology, psychophysics, and perception. The presentations were followed by extensive discussions that included all conference participants. Subsequent to the conference, each working group wrote a chapter to present their views on the state of the field in terms that can be understood by students and vision researchers working in other areas of specialization. These chapters will be published in a book by Academic Press in 1989. <i>Neurophysiological Foundations of Visual Perception</i> | | | | | |
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CONFERENCE ON THE NEUROPHYSIOLOGICAL FOUNDATIONS OF VISUAL PERCEPTION

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Conference Planning

The planning and organization of an international conference on the neurophysiological foundations of visual perception was carried out in 1986 by Lothar Spillmann (Freiburg, FRG) and John S. Werner (Boulder, CO). The initial model for the meeting was the acclaimed 1960 conference on neurophysiology and psychophysics of the visual system that took place at the Neurological Clinic of Freiburg University. The new conference was intended to take stock of what has been achieved during the last 25 years for a better understanding of vision. Because of the proliferation of information in visual science and neurophysiology, many scientists have been forced into increasingly restricted niches. The organizers felt that the conference would be most successful if the participants could step back and take a broad, fresh look at the relations between perceptual and psychophysical phenomena and their underlying mechanisms.

In the early spring of 1986, the organizers met at the Institute of Ophthalmology, London (where John Werner was a sabbatical visitor) to form a list of participants from all fields of visual science including neurophysiologists, psychologists, biophysicists and clinicians. These participants were chosen to provide expertise on all aspects of visual science from molecular processes to the philosophical principles that guide research. An attempt was also made to generate a lively balance between well established and younger investigators, in order to provide continuity between the past and future of the field. No consideration was given to national origin in choosing the participants, with the result that thirteen countries from North America, Europe and Asia were represented.

Once a preliminary program was established, invitations were sent to the first 15 guests, all of whom, were well known scientists. These individuals were asked to serve as a chair of one of the 15 working groups into which the conference participants were divided. On receiving consent of the participants and suggestions about the compatibility of members of their working groups, invitations were sent to the remaining 60 scientists. The majority of these scientists promptly expressed their interest in participating in the conference, and those unable to attend were replaced by new candidates. The invited guests were all among the best scientists in their respective fields of vision research.

Although the meeting was called a conference, it operated more like a workshop. The participants were asked to write a working paper on a topic for their particular group, and these papers were distributed to all other members. In addition, the participants were encouraged to exchange reprints, preprints and comments to members of any relevant working group. The chairs of each working group organized these materials into outline or chapter form to distribute to the members prior to the meeting.

The plan for the conference presentations was to have the chair of each working group present a 25 minute overview of the topic, followed by short presentations from members of the group. At the end of these presentations, a 30-minute discussion period was planned. Each session was, therefore, scheduled to last approximately 1.5 hours. The participants were asked to prepare their talks in a manner that could be understood by researchers outside their fields, and to concentrate on the most important correlations between brain mechanisms and perception, rather than attempt to be exhaustive. This method of organization proved to be very successful.

Several possible sites for the meeting were studied and in July 1986, the Hotel Römerbad in Badenweiler, West Germany was selected. This location was chosen because: (1) it is near the site of the original meeting on the neurophysiology and psychophysics of vision organized 25 years earlier by Professor Richard Jung, (2) a number of American participants had made plans to be in West Germany just before the meeting to attend physiological congresses, (3) it was near Dr. Spillmann's home university so that audio-visual and secretarial support could be made available at low cost, and (4) it was less expensive than comparable facilities near Dr. Werner's university in Boulder, CO.

The Conference

The conference participants arrived in Badenweiler from Zürich-Basel and Frankfurt/Main without any difficulties. Travel suggestions had been made in circulars mailed in advance of the meeting so that participants could select the most economical and direct modes of transportation. Conference minibuses were available at the Basel airport and the Basel and Freiburg train stations to shuttle the participants to the hotel.

Shortly after the participants arrival in Badenweiler, each of the 15 groups held a 3-hour meeting in separate rooms to discuss how the talks, to be given by the individual members would fit together within the session. The chair, whose job it was to incorporate the individual interests of the group members into the overall goal of the conference, had a difficult task. Without exception, however, the chairs did their job very well. The group leaders were requested to also contact other working group chairs to avoid possible overlap in the talks and to integrate, within their talks, references to related topics. As a result of the cross-referencing of ideas between neighboring groups, a coherent picture of research findings of the past 25 years emerged.

After the introductory lecture, each group presented their topic, aided by selected examples from the anatomy/physiology literature and the perception/psychophysics literature. The talks were presented in such a way that even a specialist in a different area could obtain a good overview of the questions, data and theories most prominent in the other scientists' field. The talks were informative, elegant and easily understandable. One had the feeling that, in this circle of the most highly respected vision researchers in the world, each participant did his or her best to represent their research in an attractive and comprehensible manner.

Because of the rapid change of speakers and the parallels drawn between the talks, the excitement never waned, and as a result, the number of listeners and discussion participants, remained high through the final session of the conference. The discussions at the end of the lectures were lively and objective, and brought the group together in a united effort to present their topic concisely and accurately. Expertise, rather than status, dominated. As a consequence, questions were often passed on to the other group members for further clarification. The discussions continued into the breaks, even after the organizers extended the discussion period by delaying meals or refreshments. Thanks to the informal atmosphere and the flexibility of the management of the Hotel Römerbad, everyone had the opportunity to talk with each other. Younger and lesser known listeners not giving talks were included in these discussions. Through this contact these scientists received ideas for future experiments and were often made aware of completely new directions in the approach of their own research.

The success of the conference was made apparent by the active interaction of the groups. The organizers had strived to achieve exactly such an interchange through the choice of a relaxed setting and through a social program that would keep the groups together outside the scientific meetings. These social activities included a tour of the old city of Freiburg, a concert on historical keyboard instruments in Bad Krozingen, and a continuing exhibit of art objects producing apparent movement and space by Professor Ludwig Wilding of Hamburg. Credit for this excellent social program belongs to Dr. Spillmann and his laboratory staff. Although all matters were discussed by the two organizers in the planning, the work of executing contracts and local planning fell upon Dr. Spillmann's shoulders. Fortunately, Dr. Spillmann and his lab are well experienced in dealing with an international stream of distinguished visitors and so they were able to anticipate the needs and wishes of the participants.

Most Important Achievements

Until now there has never been a meeting in which all areas of modern vision research were presented in an integrated and comprehensible fashion. Talks designed for specialists are almost always the rule. Our conference distinguished itself from these meetings by its global theme and interdisciplinary presentation of specific research areas. The aim of the conference was not to provide an encyclopedic account of all details, but to outline the most important correlations between brain and behavior and to identify the most important gaps that should be filled by future research. This goal was achieved by most of the groups.

An example of this interdisciplinary presentation of findings may be taken from the discussions of brightness perception. Jung had earlier postulated two antagonistic systems (B and D) for the perception of brightness and darkness. Since this hypothesis has been proposed, it has been shown that this distinction between the ON and OFF channels is not only apparent perceptually and neurophysiologically, but is also present histologically in various layers of the retina. In addition, both cell populations are susceptible to different pharmacological agents, so that by applying the appropriate substance to the ON system, only the signals associated with darker remain. This neurophysiological solution suggests specific algorithms that can be tested by computer simulations.

The talks revealed a series of parallels between the findings in various fields within vision research, and made apparent relationships which the listeners were previously not aware of. It is expected that, as a result of this conference, many participants will strive to use a more interdisciplinary approach in their future research.

In view of the excellent quality of the lectures and discussions, all groups agreed to the organizers' plan to produce a book based on the conference. This book will be written at a level that can be understood by first year graduate students and nonexperts seeking to bridge the large gap that currently exists between introductory textbooks and the archival reports found in journals. The book is intended to be a state-of-the-art treatise of today's knowledge of psychophysical and physiological correlations, placed in an historical context that should inspire researchers well into the next decade.

The next page presents that table of contents for the book. The organization closely parallels the conference organization, except for changes suggested in discussions with the participants. It is important to emphasize that this book will not be a typical "conference proceedings volume." Rather, each working group chair will integrate the individual contributions into a coherent presentation. In addition, Drs. Spillmann and Werner will edit the chapters to coordinate the content so that overlaps and gaps will be avoided and to assure that the level of exposition conforms to plan. In addition, each chapter will be reviewed by graduate students and experts who will be asked to critique both the scientific content and the clarity of presentation. A contract with Academic Press Inc. has been signed to publish this book in late 1988 or 1989. Due to the inevitable delays in such a large undertaking, a 1989 publication date is more realistic than 1988.

Finally, in order to make the book affordable to students and to facilitate dissemination of the conference results, the editors and individual contributors have agreed to give up any royalties associated with sales of the book. Instead, Spillmann and Werner have negotiated a contract that will guarantee book sales at a lower than usual price as well as publication in both clothbound and paperback editions. It is hoped that this book will facilitate future interdisciplinary collaboration between scientists and will also foster exchanges that transcend national boundaries.

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